Bacteria -> Gram+ -> Coccus -> Mycobacterium

* Cell wall contains mycolic acids
* Non-motile, obligate aerobes
* 20 hr replication with 2-3 weeks for growth
* Survive weeks/months on inanimate objects
* Killed by UV light and heat

*M. leprae*

* Granulomatous disease of skin and peripheral nerves -> leprosy
* Transmitted via aerosol

**Treatment**

* 6 mo of rifampicin & dapsone
* Clofazimine for severe forms of disease

*M. avium & M. intracellulare*

* Ubiquitous and pathogens of farm animals
* Typically involves lungs (maybe GI and lymph)
* T: Ethambutol + Rifampicin with Clarithromycin/Azithromycin

*M. marinum*

* Contaminated water exposure to skin trauma
* Papulonodular lesion on lebow, knee, foot, toe, finger

*M. ulcerans*

* Exposure to mud following skin trauma
* Painless lump->shallow ulcer->limb deformity

*M. tuberculosis Complex*

* *M. bovis*
  + BCG vaccine is attenuated strain
* *M. africanum*
* *M. caprae*
* *M. microti*

**Transmission**

* Aerosol following prolonged contact

**Pathophysiology**

* M. tb translocates thru lung epithelium
* Infects alveolar mγ and dendritic cells
  + Replicates inside macrophages
* T-cells secrete IFNγ to recruit more mγ
* Causes formation of granuloma
* Foam cells are cholesterol source for M. tb

**Virulence Factors**

* Lipoarabinomannam
  + Prevents phagosome fusion with lysosome
* Mycolic Acids
  + Resistant to complement
* TDM – damages neutrophil mitochondria
* 19 kDa lipoprotein – induces apoptosis
* PDIM – interferes with MDCII loading

**Symptoms**

* Cough with mucous
* CP, Dyspnea, Weight Loss, Night Sweats
* Fatigue, Low-grade fever

**Diagnosis**

* Sputum stain
  + Best during active TB
* Skin testing: DTHR to PPD
  + False-positive if BCG vaccinated
  + False-negatives is early in infection or if immunosuppressed
* Culture: BACTEC MGIT
* QuantiFERON
  + Accurately ID TB even if vaccinated

**Treatment**

* 2 months: Isoniazid + Rifampin + Pyrazinamide + Ethambutol
* 4-6 months: Isoniazid + Rifampin
* If MDR-TB: Pyrazinamide + Ethambutol/Levofloxacin
* If XDR-TB: ?
* BCG Vaccine available but not in US